

REMARKS

This application has been carefully reviewed in light of the Office Action dated March 11, 2004. Claim 1 has been amended. Claims 97 and 98 have been canceled. Claim 99 has been added. Claims 1-31 and 99 are now pending. Applicants reserve the right to pursue the original claims and other claims in this and other applications. Applicants respectfully request reconsideration of the above-referenced application in light of the amendments and following remarks.

Claims 1-31 are rejected under 35 U.S.C. § 102(e) as being anticipated by Narwankar. The rejection is traversed.

The claimed invention relates to a capacitor structure with an oxidized gas annealed uppermost top conducting layer. The presence of the oxidized gas annealed uppermost portion of the top conducting layer results in a capacitor structure with reduced capacitor current leakage relative to a conventionally formed structure (Applicants' specification, pg. 4, lines 18-20).

As such, claim 1 recites a capacitor structure comprising "a bottom conducting layer; a dielectric layer formed over said bottom conducting layer; and at least one top conducting layer formed over said dielectric layer, wherein at least an uppermost portion of the top conducting layer is an oxidized gas annealed layer." (emphasis added). There is simply no support in Narwankar for an oxidized gas annealed uppermost portion of the top conducting layer.

Narwankar discloses forming a first upper metal layer 608 on insulating layer 606 (Col. 10, lines 61-62). The "first upper metal layer 608 is then treated or annealed in an oxygen-containing environment, resulting in the upper oxygen-containing layer 610, as shown in FIG. 6e." (Col. 11, lines 4-6) (emphasis added). Next, a "second upper metal layer 612 is then deposited onto the upper oxygen containing layer 610." (Col. 11, lines 16-17) (emphasis added). As a result, the second upper metal layer 612 is Narwankar's uppermost top conducting layer and is not annealed.

Applicants' specification states that "during subsequent wafer fabrication, the dielectric layer develops oxygen vacancies which contribute to capacitor current leakage." (Pg. 3, lines 20-22). Applicants' claimed processor structure "improves the dielectric property of the dielectric layer 36 by adding an oxidizing gas anneal (second anneal) which fills the oxygen voids created in the dielectric layer 36 after the top conducting layer 38 is deposited." (Applicants' specification, pg. 8, lines 8-10) (emphasis added).

In contrast, Narwankar teaches that the second metal layer 612 is deposited after the first metal layer 608 is annealed (which becomes layer 610). Narwankar does not teach that the second metal layer 612 is annealed. Since Narwankar teaches that the uppermost layer, here, metal layer 612, is deposited after the oxidizing anneal, oxygen voids would still be present in the dielectric layer. Thus, Narwankar merely teaches a conventionally formed top electrode and not Applicants' claimed capacitor structure with an oxidized gas annealed uppermost portion of the top conducting layer.

For at least the foregoing reasons, claim 1 is allowable over Narwankar. Claims 2-31 depend from claim 1 and are similarly allowable along with claim 1.

Similarly, for at least the reasons provided above with regard to claim 1, claim 99 is allowable over the prior art of record. Specifically, Narwankar does not disclose or suggest a capacitor structure comprising "a bottom electrode; a dielectric layer formed over said bottom electrode; and a top electrode comprising at least one conducting layer formed over said dielectric layer, wherein at least an uppermost portion of said conducting layer is an oxidized gas annealed layer." (emphasis added).

Narwankar discloses that, "[t]he upper oxygen-containing layer 610 and the second upper metal layer 612 together form the upper electrode 615 for the capacitor structure 650." (Col. 11, lines 33-35) (emphasis added). In other words, Narwankar's top electrode comprises two separate layers: an oxygen-containing layer 610 and a second upper metal layer 612. Thus, the top conducting layer in Narwankar's structure is layer 612. Layer 608 becomes layer 610 after annealing. Layer 612 is formed over layer 610.

Thus, the oxygen-containing layer 608 (e.g., 610) is not the uppermost top conducting layer in Narwankar's structure. For at least these reasons and more, claim 99 should be allowable over Narwankar.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Respectfully submitted,

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